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AUTHOR Williams, Hill, Jr.; Evans, Mel
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ABSTRACT

The purpose of this study was to determine if there was any significant difference in overall leg strength gains in individuals with sickle-cell-trait as compared to non-sickle-cell-trait individuals, as measured by the leg dynamometer. Twenty black male first-year college students were used in this study. The subjects were divided into a control group which was randomly assigned and an experiemental group assigned on the basis of sickle-cell test results. The subjects were pretested for overall leg strength. Both groups then followed the same exercise program three days a week for an eight-week period. All exercise periods consisted of five minutes. On completion of the exercise program, a posttest was administered to both groups. Both a t-test and a Mann-Whitney U-test were used to test the hypothesis. Results indicated that high intensity exercise had no more effect on overall strength gained in the legs of non-sickle-cell-trait than on sickle-cell-trait individuals. (Author/PB)

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THE EFFECTS OF HIGH INTENSITY EXERCISE ON OVERALL LEG STRENGTH OF NON-SICKLE-CELL-TRAIT AND SICKLE-CELL-TRAIT INDIVIDUALS

By

Hill Williams, Jr. and Mel Evans

The plight of people with sickle cell disease is grave. In the decade from 1960 to 1970 mortality rate increased by 2.8 percent. Although there has been much attention given to the disease in recent years, a cure has not been perfected. Dispite the air of pessimism, many positive things have been happening in the area of research, dissemination of information, and health care. Although we have made progress in all of these areas related to sickle cell anemia, knowledge relative to the effects of exercise on people with sickle trait has not been in abundance or apparently forthcoming.

At Jackson State University these investigators felt that it was important for us as physical educators to learn as much as possible relative to responses of individuals with sickle-cell-trait to high intensity exercise. It was felt that it is important that all physical educators, health educators, and recreators who have the responsibility for promulgating programs in these areas to be informed with respect to the reaction of people with sickle-cell-trait to exercise that require excessive exhustion.

Most physical educators agree that strength is a major component of physical fitness; that without muscular strength it is difficult to claim a high degree of physical fitness and well-being. The purpose of this study was to determine if there was any significant difference in overall

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leg strength gains in individuals with sickle-cell-trait, when compared to non-sickle-cell-trait individuals.

For the purpose of this study a general hypothesis was tested. This hypothesis stated that there was no significant difference between strength gained by sickle-cell-trait and non-sickle-cell-trait individuals as the results of all out exercise when measured by the leg dynamometer.

Twenty black male freshmen, ranging in ages from 18 to 24 years, were utilized in this investigation. The subjects were divided into two groups, control and experimental. The control group was randomly assigned and the experimental group was assigned on the basis of the sickle cell test results. The subjects were pre-tested for overall leg strength. Both groups followed the same exercise program. The program consisted of the Harvard Step Test, exercising three days a week, Monday, Wednesday, and Friday, for an eight-week period.

It was felt by the investigators that the Harvard Step Test, although basically a cardiovascular test, could be used to increase overall body strength including the legs.

The leg dynamometer was used to measure leg strength. The test re-test method was used to ascertain the reliability of the testing instrument. A pearson r was computed and yeilded a correlation of 0.99, indicating substantial reliability.

All exercise periods consisted of five minutes. Upon completion of the exercise program a post-test was administered to both groups.

The t-test and the Mann-Whitney U-test were utilized to test the hypothesis. The t-test data were computed by the Olivetti Programmer 101 Computer. The Mann-Whitney U data were computed by hand.

The results of the study showed that statistically there was no significant difference in the overall gain in leg strength of non-sickle-cell-trait individuals and sickle-cell-trait individuals when subjected to high intensity exercise. The null hypothesis was confirmed by both tests, the t and the Mann-Whitney U.

Although the null hypothesis was supported by the results, the numerical values indicated that there was an increase in the overall leg strength of both groups. The pre-test revealed that the non-sickle-cell trait group and the sickle cell trait group had mean pull values of 948 and 851 pounds respectively. The post-test showed mean pull values of 1014 and 948 respectively.

The data indicated that the numerical gain was greater in the non-sickle-cell-trait group than in the sickle-cell-trait group.

One could speculate from this numerical gain and conclude that under another set of controlled conditions that these changes could develop enough to indicate statistical significance. For example, if a pure strength test were administered with weights; or if the period of experimentation were lengthened; or if the workload were increased, changes could be great enough to be statistically significant. Perhaps treatment each day for the eight week period would create more changes than the three days per week

as was the case in this investigation.

The authors of this study invite researchers to replicate this study or otherwise initiate studies in this area. Their findings may have tremendous implications for a large number of people who are disadvantaged due to discrimination by insurance agencies, employers, and many other institutions in our society.